GEObusiness in galvanizing companies:

See, Know, Analyze, Decide, Optimize.

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ABSTRACT:

The use of **geomarketing** technology allows the user to see on maps customers, prospects, socio economic data in order to:

- find best location for a new depot/agency/...
- verify Cannibalization areas (these were the common sales areas within the different plants)
- balance the salesman regions
- modify sales strategy analyzing:
  - weak areas
  - behavior of customer
  - behavior of salesman
  - potential customer
  - competitors
  - ....

Geomarketing is often integrated with **routing** applications in order to optimize salesmen and delivery activities and with **field force management** application giving to the salesman tablet or PDA to support his activity on the field.

It will be presented the case study of Gruppo Bisol

- 7 plants/subsidiary companies
- About 28.000 customers
- 300 employees
- Over 170 million € yearly turnover
- Head office in Treviso province, Italy

Web Gis for geomarketing and mobile mapping: Bisol galvanizing company case study

Geomarketing is a natural extension of marketing able to take in consideration a very important aspect, the geography.
Let's take into account how important it is for a company today to know where its customers, prospects and competitors are geographically located.
Using this information it can be properly decided where to locate a new plant or how to enable more effective marketing strategies based on socioeconomic information in a certain area.

These are only some of the possible applications of geomarketing but they are useful to perceive the enormous potential of this instrument.

Tellus developed a WebGis infrastructure composed by the following modules:

- ADDRESSfinder, a WebGIS tool for normalization and geocoding;
- SITEfinder, a WebGIS tool that automatically optimizes and balances the zones depending on specified parameters and constraints;
- MARKETfinder a WebGIS geomarketing application allowing analysis, creation of thematic maps, modify zoning, ….;
- PATHfinder a WebGIS routing application that optimizes the agenda based on the parameters (time slots, costs, ...);
- PALMfinder, a tool on PDA to support the field activities of salesmen.

Using these tools we have been working with Bisol for:

- normalize, geocode and cut the duplicates for the customers database
- balancing and optimizing salesmen areas
- organizing the everyday agenda in order to visit the customer for the correct number of times per month in the right time window
- optimizing the routes of the salesman
- ....

In this document I will not go through the functionalities of GIS and geomarketing tools but I'll concentrate the attention on the one used in the project.

Goal of the sales network and description of tools

The goal of the geomarketing analysis was the Bisol sales network.

The aim of the project consisted in organizing the Bisol sales force, optimizing the working agenda and the everyday route for each salesman using geomarketing tools.

The optimization of the working agenda was implemented through the reduction of the driving time from one customer to another and the increase of the presence in the customer place. The analysis of sales network and the determination of the best agenda for staff has been done respecting specific parameters established by Bisol itself.

It was planned a specific method for the network that can be summarized in the following phases:

1. normalization and geocoding of the database of the customers
2. definition of the salesman areas respecting the constraints of the company
3. optimization of everyday agenda and routes.

Normalization and geocoding

The first activity has been the normalization and geocoding of Bisol data base using ADDRESSfinder.
The normalization process is divided into two phases: a phase of normalization in which ADDRESSfinder automatically selects and finds the correct address and a second phase of assisted geocoding for addresses in which the ambiguities are such not to allow an automatic choice.

The tool, choosing from a standard data base of addresses (in this case Navteq), associates to each record the address written in the correct way.

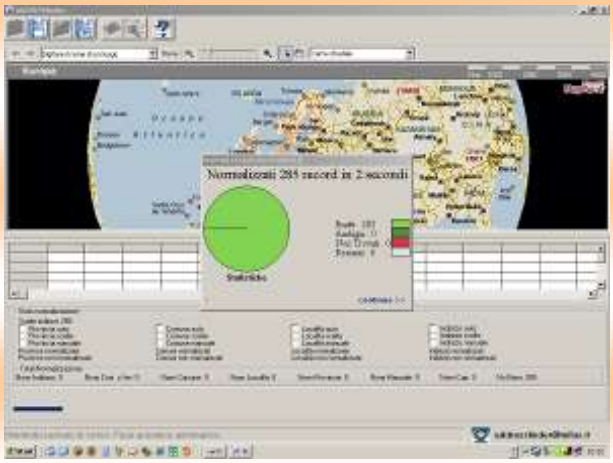

Image 1: automatic geocoding interface

At this second stage ADDRESSfinder proposes alternatives which you can choose from, or allows to search the address on the map. The normalization phase provides this type of automatic and manual operations for each of the address token, starting with the province, followed by the postal code, town, village and ultimately street.
Obviously, if you do not find the match for one of the components, the address is normalized and later geocoded at the level immediately preceding it. For example, if there is no match for the street the address is normalized at a municipality level.

The issues raised during the normalization can be traced to the following types:

- ambiguous addresses (eg. Via Garibaldi. The software gives two solutions, Anita Garibaldi or Giuseppe Garibaldi. The non-specific name leads to the impossibility of choice);
- incorrect addresses or the generic (in many cases instead of the street was stated "at the shopping mall" or "at the industrial area");
- incomplete addresses (eg. When there is no postal code can be difficult to go back to it because very often the same road may fall into different postal codes);
- ....

This procedure has resulted in 93% of records geocoded at street-level and 7% at municipality level. To correct these results, we have carried out a further phase of analysis between the addresses that could not be geocoded to the street level using also the white pages.

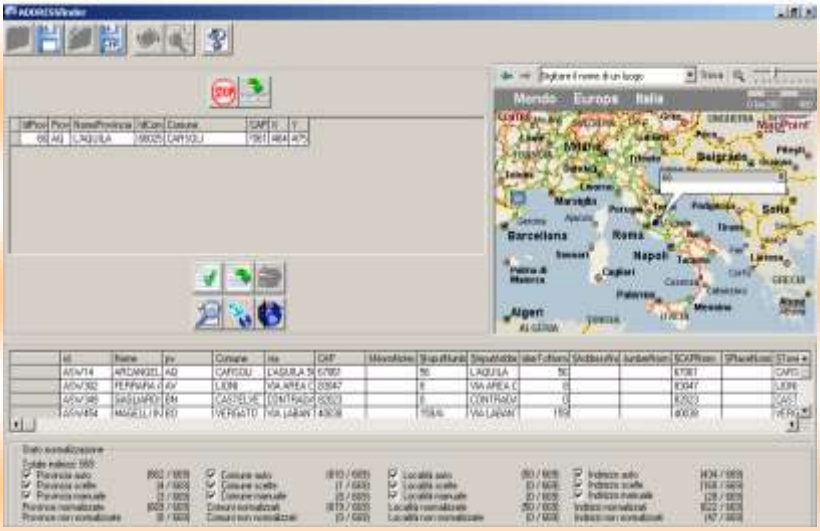

Image 2: sample of interface

Sales Network

Basics and benchmark parameters

The network of Bisol in Italy consists of about 28.000 points of sales.
The objective was to determine the sales areas balanced according to the parameters indicated by the company which were:

- areas with no more than 220 PoS (Point of Sales);
- tripartite division of PoS in Gold, Silver and Bronze. The three types are identified based on the frequency assigned to each yearly visit, 4 for Gold, 2 for Silver and 1 for Bronze;
- the duration of each visit to PoS is set at 35 minutes;
- each salesman should not travel more than 200 km per day;
- the monthly working days for each salesman is 14 with 8-hour workday. It's considered one hour lunch break while, in the computation of eight hours, it is excluded the trip from house to work;
- minimum number of daily visits of 10. During the project this parameter was reduced to 8, because to make 10 visits a day for 35 minutes means that each salesman is almost 6 hours per day by customer which is too much for the 8 hours working day.

On the basis of zones created and the salesmen placement the best visiting routes for each salesman were then identified.

Zoning
Data normalized and geocoded have been loaded into MARKETfinder that generated a nationwide map with the representation of PoS in a different color depending on the salesman.

Based on the parameters set for the network approximately 125 areas were assumed in accordance with the following calculation: (28.000 total PoS/220 PoS per salesman). At the same time it was considered important to respect the time parameter calculated in a range between 47,000 and 59,000 minutes.

This last parameter was determined by taking the 35-minute visit, multiplied by 168 working days (14 days per month for 12 months) and multiplied by the number of visits per day per salesman measured in the yearly period.
The areas of responsibility have been balanced considering this parameter in time and according to that defined by Bisol of 220 to PoS per salesman.

The problem which emerged in this phase was the difficulty to balance the two parameters simultaneously, due to the uneven location of POS in the area.

For example, while a visit to Gold will have a frequency equal to 4 and accordingly will have greater weight in calculating the total minutes, a Bronze will have a frequency of 1 visits and thus less weight.
Contacted on the matter Bisol sets the priority to respect the constraint salesman 220 to PdV.
The imperative of respecting this constraint forced us to change strategy and working method.

For the network two separate projects were then made:

- the first named Bisol 1 in which 120 areas have been identified balanced according to the visit time;
- the second named Bisol 2 in which we have identified 123 areas balanced according to the parameter 220 to PoS per salesman.

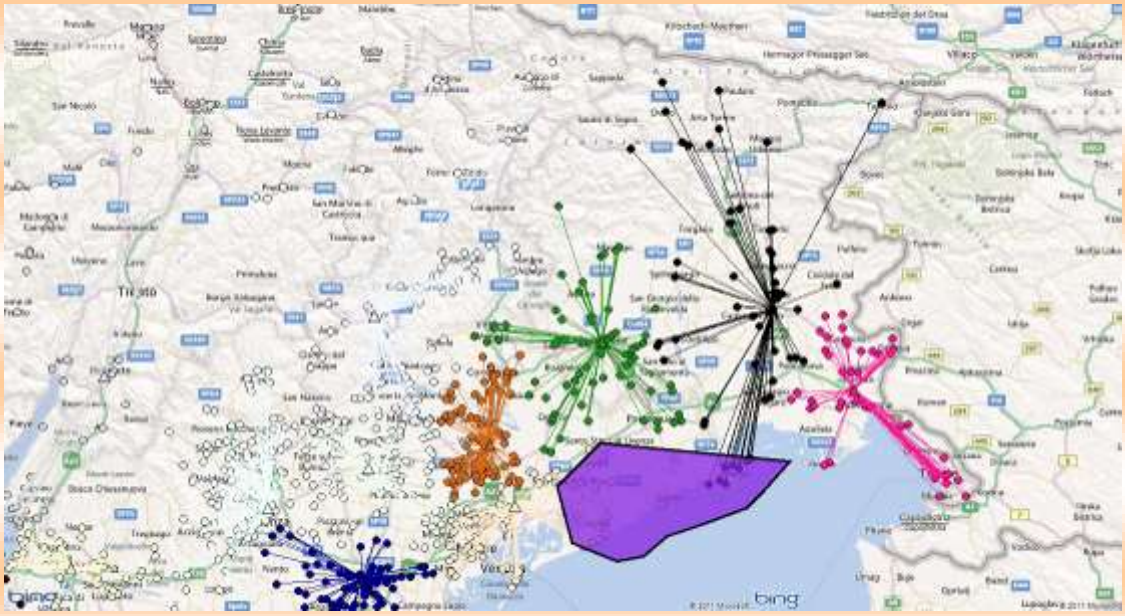

Image 3: balancing areas on the map

Image 4: result of the activity for the Gorizia and Trieste provinces

Similarly, areas with a high density of PoS or PoS with a high frequency of visit were treated by creating, within them, smaller areas.

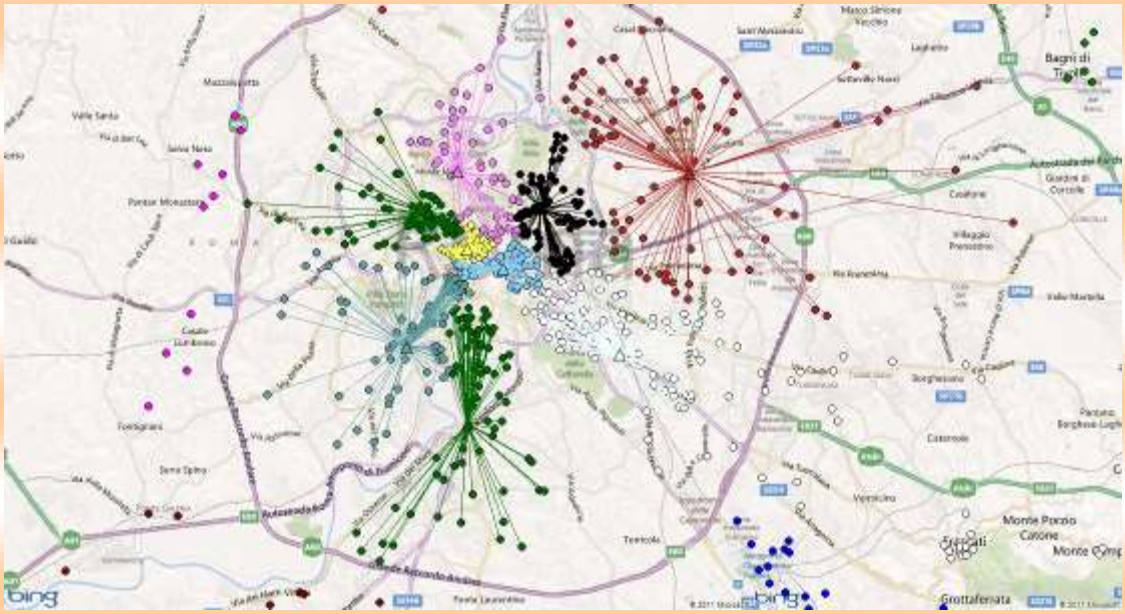

Image 5: balancing areas in Roma

For #2 profile the same process of grouping the provinces was followed but in this case we have tried to create areas as uniform as possible under mandatory constraint of 220 visits per salesman.

The creation of two options was motivated by a desire to submit to Bisol, along with a project strictly subject to the constraint of 220 to PdV salesman, a project privileging the time parameter.

This need has arisen during the creation of areas, where certain anomalies emerged due to the distribution of PoS throughout the country, some very concentrated and so with short distances, other dispersed not allowing to strictly comply with the constraint of 220 without incurring at the same time an overrun of the bond mileage.

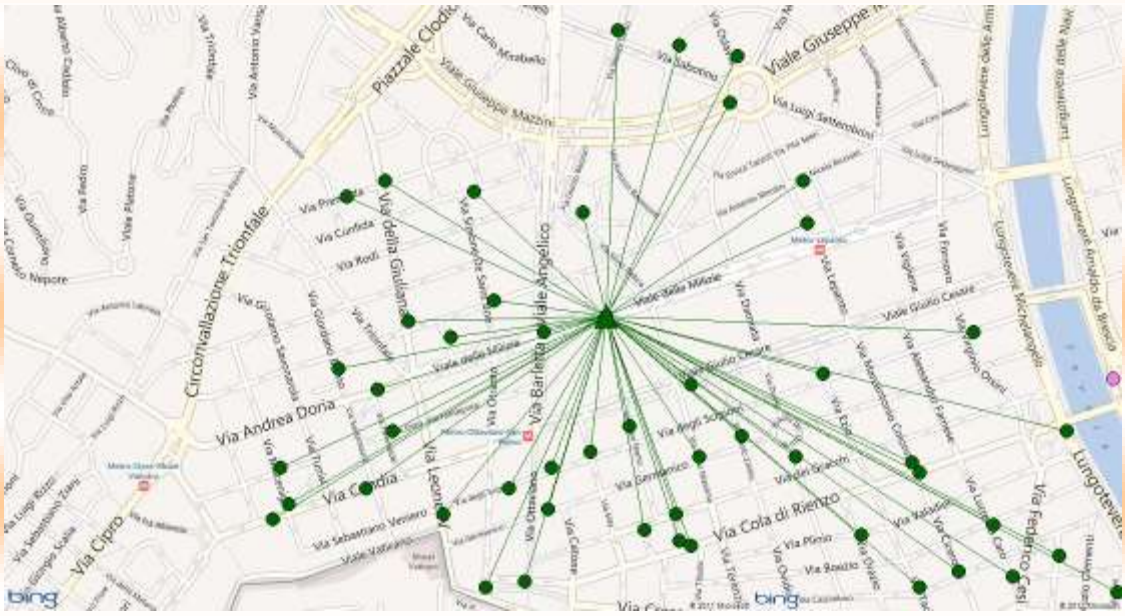

Image 6: House of the salesman connected to customers

Both Proposal have been made available to Bisol via the Internet using the Asp geomarketing MARKETfinder tool in order to allow them to check and modify the work done.

Image 7: salesmen areas and starting points (houses)

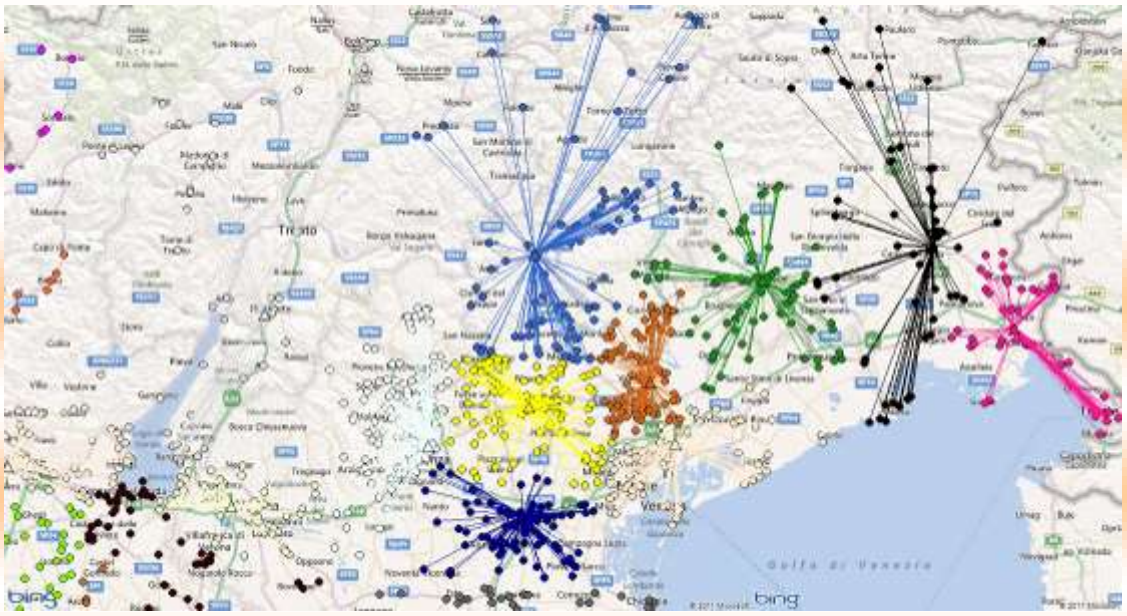

Image 8: detail of north-east Italy

Analysis and definition of agendas

This data have been loaded in PATHfinder that generated for each of 120 areas the best visiting routes for the 168 working days in the yearly period. The application automatically calculates the routes, time and sequence of visit, reducing costs and respecting the parameter set.

Image 9: weekly planning for a salesman

Image 10: working day for an salesman

At this stage the parameters considered are:

- the eight hours per day
- 168 working days in the year
- Minimum of 10 visits per days per salesman
- the respect of the maximum distance of 200 km for each route of visits,.

The parameter of a minimum of 10 visits per day per salesman was later reduced to 8. In the daily working practices were found cases of days with a number of visits lower than the minimum benchmark that must be considered inevitable if you want to avoid slippages in the arrival times and then overtime.

Results

The result is the agenda of each salesman daily visits with the optimal sequence respecting frequency of intended visits to the three types of PoS, time spent at the POS (35 minutes), working hours including lunch break (1 hour), starting points and the maximum distance traveled by each salesman per day (200 Km).

The conformation of the territory and the constraints on 8 working hours, on up to 200 km per day have meant that compliance with the constraint of minimum 8/10 daily visits per salesman has been observed in 50% of cases.
For each salesman are therefore specified day by day:

- the total cost and cost of travel;
- length of the routes;
- total time, time slot, departure and arrival time;
- the number of actual visits.

At the further stage of verification and control the output thus obtained revealed overruns for some staff time and maximum km that can be attributed in most cases to the configuration of the land (mountains, connection with islands, ...).

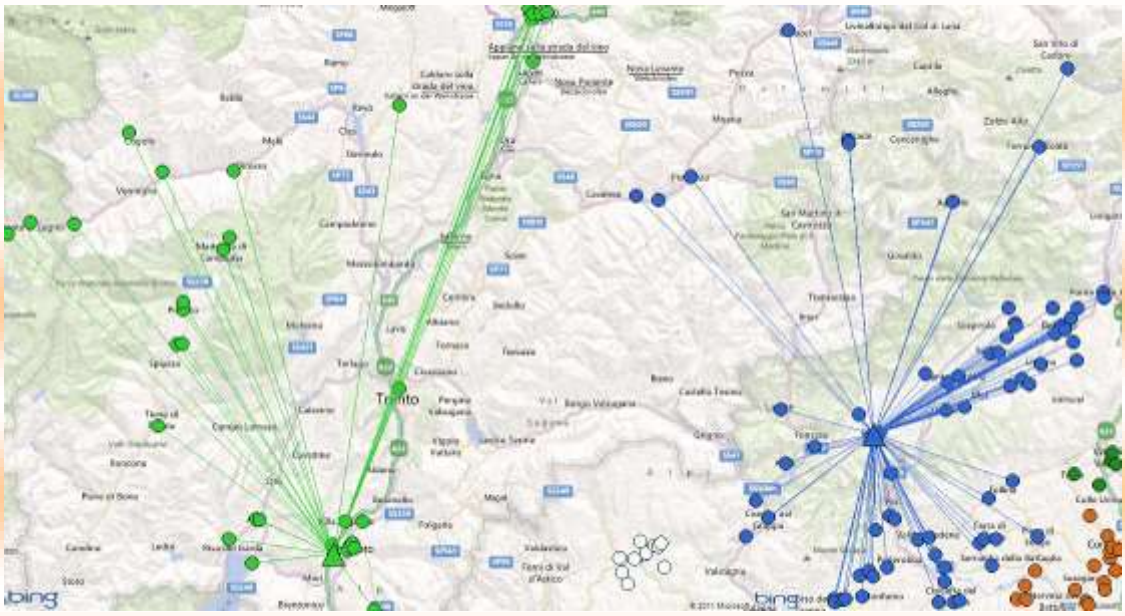

Image 11: salesman of Dolomiti area

Image 12: salesman of Eolie islands

PALMfinder

Through this application, installed on the personnel PDA, the agenda is sent to the salesman.

He can use the navigation system to reach the customers and can use the application to insert the data collected during the meeting.

These information are transferred in real time to the company information system.

Image 13: PALMfinder and Navigation

The company has the possibility to compare the work done with the planned one in order to be able, eventually, to reschedule the activities in case of delay or problem.

Through this application the company is also able to account and certify the workability of the salesman (working hours, km driven, stops, activities ...).

Thematic analysis on Bisol data

The project developed for Bisol has had its primary goal in the organization of sales networks using geomarketing functions for balancing, planning and optimizing.

The potential of geomarketing is not exhausted in the optimization of logistics aspects, but it is also very useful for thematic analysis on business data aiming to highlight aspects of the market that are not detectable with ordinary tools (data mining, datawarehouse, …).

For this reason thematic analysis were conducted on Bisol data to determine the market share on the national territory, thus providing an additional means of information from which assessments and any additional marketing initiatives may arise.

To highlight the market share we have prepared a first theme representing the percentage of customer over the universe of prospects
.
To determine the potential customers the company has bought and uploaded a database of potential customers with industries, metal carpentries, coachworks, machine shops, … .

Image 14: thematic map on market share

The thematic analysis indicates that the regions colored in red, in particular the center-north, are areas where the market share is higher. On the contrary, the regions of central and southern Italy show a worst market share.

This simple analysis can be the base for promotions and advertising in order to increase active customers in southern regions.

A second thematic map has been created to investigate in more detail the market share in the provinces of Emilia Romagna and Tuscany region limiting the inquiry only to industrial Customers.

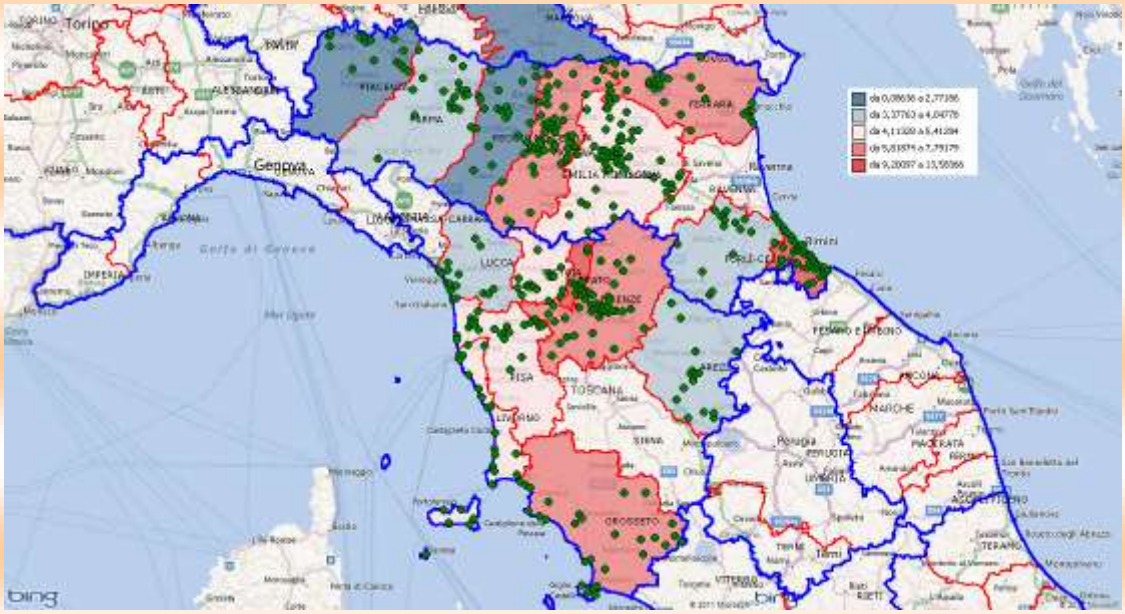

Image 15: industrial Customers of Tuscany and Emilia-Romagna

It can be noted that the provinces of Ravenna and Siena are characterized by a complete absence of customers "industry".
Similarly, areas of Piacenza and Reggio Emilia, are areas with a potential market still untapped by Bisol attesting to a low level of active customer "industry".

Project Bisol evaluation

As far as the project developed for Bisol SpA we can draw some considerations concerning the working method adopted.

We consider very positive the continuous contact established from the beginning between the company, which commissioned the Work Force Management project, and those who put it into practice.

This was particularly aided by the fact that all the applications used were WebGIS easy to use and allowing a easy sharing of data, maps, simulation and analysis.

This has not only allowed a continuous updating of Bisol regarding the project steps but also a constant dialogue with it to allow the solution of the issues that have arisen during the various stages of work by comparison and not by unilateral decisions.

The case study described allows us to "generalize" the quality of those tools that can become an opportunity for companies aiming to improve their services and who want to gain a gap over competitors.

This direct experience made us realize that despite the use of sw tools in such a complex process unpredictable difficulties may emerge which require high problem solving capabilities that only human experience and intuition can grant.

Authors Biography

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Researcher in GIS and geomarketing at the University of Udine, lecturer in Italian (Modena, Treviso, Venice, Florence) and foreign (EAST London, Uppsala, Caen, Murcia, Sofia, Tunis and Cairo) universities. President of Udine Servizi SPA (company owned by Udine municipality), Vice President of SAF Autoservizi FVG spa (public transportation company of Udine Province), member of CARTESIO (Research Centre in GIS and Remote Sensing), member of the Didactic Council for the Masters in GIS of the University of Udine, President of Tellus SPA, GIS company founded in 1997. Currently working on GIS projects in the geomarketing and logistic field.